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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	)	
	)	
Amendment of Part 25 of the Commission's	)	IB Docket No. 96-220
Rules to Establish Rules and Policies	)	
Pertaining to the Second Processing Round	)	
of the Non-Voice, Non-Geostationary	)	
Mobile Satellite Service	)	

To: The Commission

COMMENTS

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SUMMARY

In this proceeding, the Commission proposes to establish policies and rules for the assignment of spectrum to second round applicants in the below 1 GHz Non-Voice Non Geostationary Mobile Satellite Service ("NVNG MSS" or "Little LEO"). In these comments, Final Analysis Communication Services, Inc. ("Final Analysis") offers economic, technical and legal justification for the licensing of all qualified second round applicants according to a band plan that avoids mutual exclusivity and pursuant to spectrum policies that promote the swiftest possible development of a fully competitive Little LEO industry.

Final Analysis supports the Commission's tentative conclusion that first round licensees should be excluded from this proceeding, at least to the extent that they should receive no further spectrum assignments unless and until new second round licensees have been assigned enough spectrum to enable them to implement constellations fully competitive with first round systems.

Final Analysis also supports the Commission's proposal to prohibit affiliations that may permit first round licensees to gain access to second round spectrum assignments to the detriment of new entrants. Final Analysis asserts that its own arrangement with VITA is not captured by the proposed affiliation rules and requests the Commission for confirmation to that effect.

Final Analysis provides a detailed Market Analysis, attached as Exhibit 1. As requested by the Commission, this Market Analysis applies the principles of the structure-conduct-performance ("SCP") paradigm of industrial economics. Final Analysis believes that

the Commission has sufficient precedent under its open skies policy to adopt pro-competitive policies in this proceeding. Nonetheless, the use of the SCP approach is instructive.

The Market Analysis demonstrates that: (i) there is large and growing demand for Little LEO services sufficient to support entry of all of the new second round applicants; (ii) Little LEO services will be offered in a wide variety of submarkets with diverse supply and demand characteristics; (iii) along the continuum of Little LEO services, those offered with low polling frequency (i.e., intermittent coverage) are more demand elastic and have more substitutes, but still would benefit from competitive entry; while those offered with high polling frequency (i.e., near real time) are least demand elastic and would benefit most from competitive entry; (iv) the Commission's technical proposal which requires timesharing would preclude second round licensees from being fully competitive in market subsegments requiring near real time coverage; and (v) the Little LEO market is not yet competitive in any of the relevant submarkets and additional entry would be beneficial to maintain pressure on price as well as to reduce customer perceptions of risk associated with switching to Little LEO services.

Final Analysis also provides a detailed technical Systems Analysis, attached as Exhibit 2. In this Systems Analysis, which is supported by independent study supplied as Attachment A to Exhibit 2 as well as by findings of the ITU-R's Working Group 8D document supplied as Attachment B to Exhibit 2, Final Analysis demonstrates that the Commission's spectrum proposal has serious limitations. First, there is insufficient spectrum for full deployment of proposed constellations. In particular, Little LEO constellations require a minimum of 50 kHz of dedicated feeder link spectrum in each direction for one satellite, and approximately 150-300 kHz of dedicated feeder link spectrum for a

constellation with three or more satellites covering the U.S. simultaneously with full or partial footprints. Also, most Little LEO constellations, including the one proposed by Final Analysis, require proportionately more uplink than downlink to support data acquisition applications. Finally, the proposed TDMA/FDMA sharing method is not appropriate or practical on an inter-system basis. The Commission's proposed systems do not accommodate these Little LEO characteristics.

Second, the timesharing requirements proposed by the Commission would limit maximum possible coverage by a second round Little LEO operator to approximately 65% of the time. This is below the Commission's estimates, and severely constrains service application opportunities. Also, timesharing requirements and frequency change requirements, particularly in connection with Little LEO System-3, proposed to be shared with the Department of Defense, would encumber the little LEO operator with additional costs and complexities. Final Analysis itself currently has the technical capabilities of meeting these requirements, but believes they can and should be somewhat imitigated for the sake of a competitive industry.

Final Analysis's review of the specific systems proposed by the Commission in light of the above issues results in the following conclusions: (i) Little LEO System-1 is not suitable for commercial deployment because of the lack of sufficient dedicated feeder link spectrum; (ii) Little LEO Systems-2 and 3 will support commercially viable, but not fully competitive, Little LEO systems due to the significant outages that would occur. Also, the determination that each proposed system is unique, and therefore that applications for each spectrum segment are mutually exclusive, is unnecessary.

Final Analysis also offers three alternative band plans, provided as Exhibit 3 hereto. Under Alternative 1, four discrete and essentially fungible systems may be identified through slightly different combinations of the uplink and downlink spectrum proposed in FCC Little LEO Systems-2 and 3. Alternative 2 also allows authorization of all four second round applicants, while avoiding mutual exclusivity, by customizing the spectrum allocations to second round applicant market requirements. Alternative 3 would assign the same spectrum to all qualified second round applicants subject to band sharing criteria.

Final Analysis also still maintains that, if all else fails in efforts to license all second round applicants in circumstances that avoid mutual exclusivity, its original virtual constellation concept, which also would accommodate all applicants in an interim solution, should be considered.

In order to ensure deployment of fully competitive systems, Final Analysis proposes that WRC-95 spectrum be allocated and assigned in this proceeding, and that additional international allocations of Little LEO spectrum resulting from WRC-97 and/or future conferences be reserved to existing second round licensees for deployment of fully competitive systems, before any new applications are accepted for filing in a third processing round.

Final Analysis also argues in its comments that the Commission adopt licensing rules that eliminate barriers to entry while discouraging warehousing. The Commission should make every effort to avoid mutual exclusivity in this proceeding. In any event, the Commission should not resort to auctions because the use of such procedures for licensing global systems will only increase costs and delay implementation of services for which the major public benefits are low cost and accessibility.

The Commission should not adopt its tentative proposal to increase financial qualifications standards to require a showing of financial resources sufficient to construct, launch and operate an entire constellation for one year. Proposed constellations are of varying sizes. Also, all constellations are implemented in phases with revenues projected to be earned after the launch of two satellites. In such circumstances, the proposed revised financial requirements would have a disproportionate adverse impact on some applicants without being particularly relevant to actual financial requirements.

Protection against warehousing can be achieved through imposition of due diligence milestones, consistent with requirements in other satellite services.

Final Analysis also asks for clarification that amendments to modify authorizations to change orbit parameters and/or constellation design will not be considered major amendments under Part 25 of the Commission's Rules if no additional spectrum is used and no greater risk of interference is created.

Final Analysis observes that many potential problems with unauthorized transmissions will be addressed by location determination features planned by Little LEO operators (in their user terminals). However, due to costs, such features should not be mandatory. Final Analysis recommends that the Commission not adopt any proposals to protect against unauthorized user terminal transmissions that may increase costs to consumers of Little LEO services.

Final Analysis supports the Commission's proposal to prohibit exclusive arrangements with foreign countries, and also supports the Commission's proposal to maintain various other existing service rules applicable to Little LEO systems.

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In the Matter of	)	
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Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service	)	IB Docket No. 96-220

To: The Commission

COMMENTS

Final Analysis Communication Serivces, Inc. ("Final Analysis"), by its attorneys, hereby submits its comments on the above-captioned notice to establish rules and policies for the non-voice, non-geostationary mobile satellite services (hereinafter, "NVNG MSS" or "Little LEO").[1] For the reasons discussed below, Final Analysis urges the Commission to adopt rules that will promote the pro-competitive deployment of Little LEO service by allocating sufficient spectrum to, and licensing only, qualified second round applicants in a spectrally efficient and expeditious manner.

[1] See Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service, Notice of Proposed Rulemaking, IB Docket No. 96-220, FCC 96-426 (released October 29, 1996) ("Notice"), Erratum, DA 96-1920 (released November 18, 1996) ("Erratum)

I. INTRODUCTION

Final Analysis is building and preparing to launch and operate a worldwide, digital low earth orbit satellite telecommunications system that will offer low-cost, high-quality two-way data transmission services such as paging, e-mail, data acquisition, fixed and mobile asset tracking and position location determination. Final Analysis also has launched one satellite under an FCC experimental license and will soon launch a second satellite under an additional FCC experimental license.[2] Final Analysis also has taken an active and continuing role in international radiocommunication study groups. In light of Final Analysis's long-term plans to deploy a global Little LEO system and its ongoing experimental licensing and advocacy efforts before the FCC and in international arenas, Final Analysis has a significant stake in this proceeding.

Adoption of rules to promote the pro-competitive assignment and use of Little LEO spectrum will best speed the delivery of satellite-based data messaging services to the public. Accordingly, Final Analysis urges the Commission to adopt its tentative conclusion that awarding licenses only to entrants in the second Little LEO processing round is in the public interest.[3] Final Analysis applauds the Commission's tentative decision to apply its "open skies" policy goals of encouraging entry by qualified applicants and giving operators maximum flexibility to tailor their offerings to meet customer requirements in order to

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[2] Final Analysis launched its first satellite, FAISAT-1, under an FCC experimental license in the first quarter of 1995 and expects to launch its second satellite, FAISAT-2V, under another FCC experimental license. As previously reported to the Commission, Poland, Mongolia and Germany, among others, have applied to work with Final Analysis on aspects of international experimentation associated with FAISAT-2V. Letter from Final Analysis to Scott Blake Harris, Chief, International Bureau, FCC, dated December 19, 1995.

[3] Notice at ¶ 10.

encourage robust competition and consumer welfare in the Little LEO marketplace. As demonstrated herein, all Little LEO submarkets will benefit from additional competition, and the overall market can support entry by all second round applicants. Moreover, Final Analysis demonstrates that the spectrum available in this proceeding can and should be assigned in a manner that not only accommodates all new applicants, but also avoids mutual exclusivity.

The licensing issues being considered in this docket are the critical first steps in building the overall framework that ultimately will facilitate fully competitive Little LEO systems. Licensing additional second round applicants will ensure important competitive entry in many Little LEO submarkets. However, as demonstrated herein, Little LEO submarkets are diverse and varied, and the time sharing constraints proposed by the Commission preclude competitive entry in near real time market subsegments. Accordingly, the Commission must take a long-term view in establishing licensing rules for the second processing round so as not to foreclose future opportunities for the maximum development of fully competitive Little LEO systems. Specifically, the Commission should ensure that the entities licensed in this proceeding are given priority for assignment of additional spectrum that may become available for Little LEO services globally and that are needed for near real time operations.

II. THE COMMISSION SHOULD LICENSE THE SECOND ROUND APPLICANTS TO CREATE A FULLY COMPETITIVE NVNG MSS MARKET

A. Economic Analysis Indicates More Competitors Are Needed in the NVNG MSS Market

1. The Commission Should Affirm its Tentative Conclusion to Exclude First Round Licensees To Promote Competition in Little LEO Markets

In the Notice, the Commission tentatively concludes that first round licensees should be excluded from the second round.[4] Final Analysis agrees with this conclusion, at least with respect to assignment of additional WARC-92 spectrum. Final Analysis agrees that Little LEO markets should be characterized by fair and vigorous competition in order to bring to consumers lower prices, as well as increased and innovative services and supplier options. Much greater public benefit is to be gained by assigning this spectrum to additional entrants in the Little LEO service than merely expanding the systems already licensed in the first round.[5]

As discussed further below, the Little LEO market is now, and for the next few years essentially will be, a monopoly. Consumers, however, desire competition in order to have choice among suppliers. The lack of even the appearance of competition, especially in new technology markets, tends to foster consumer skepticism and stifle market growth. Final Analysis believes that several competitors can be sustained by the potential market that

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[4] Notice at ¶¶ 11-18.

[5] However, as explained further below, Final Analysis would agree to assignment to the first round licensees of the specific additional WARC-92 spectrum they have requested if additional spectrum becomes available for second round applicants from WRC-97 such that second round applicants also can implement fully competitive constellations.

currently exists, and that authorization of a total of six commercial licensees would actually help the industry develop and mature.

2. Promotion of Additional Competition in Little LEO Services is Supported by Well Established Commission Precedent

As noted in the Notice, the history of the Commission's approach to new satellite services is to foster new entry and competition.[6] In implementing its open skies policy, the Commission consistently has focused on the benefits of competition as promoting innovative technology, diversity of services and lower costs to consumer.[7] Throughout the history of the satellite industry, the Commission has done whatever it could to ensure opportunities for entry of viable new competitors. It has consistently developed new and innovative approaches to accommodating multiple entrants such as reducing orbital spacing,[8] viewing orbital locations as "fungible,"[9] and requiring competing applicants to join resources.[10] The common thread through all of these decisions has been the Commission's unwavering commitment to bringing to the public the benefits of multiple entry, including swift

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[6] Notice at ¶¶ 10, 20.

[7] See Establishment of Domestic Communications-Satellite Facilities by Non-Governmental Entities, Second Report and Order, Docket No. 16495, 35 F.C.C.2d 844 (1972), recon., 38 F.C.C.2d 665 (1972) ("Open Skies").

[8] See Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions, CC Docket No. 81-704, FCC 83-184, Report and Order (released August 16, 1983) ("Domsat 2-Degree Spacing Order").

[9] See id.; see also Processing Procedures Regarding the Direct Broadcast Satellite Service, 95 F.C.C.2d 250 (1983).

[10] See Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services, 2 FCC Rcd 485, 486 (1987) ("Consortium Order"), aff'd sub nom. Aeronautical Radio, Inc. v. FCC, 983 F.2d 275 (D.C. Cir. 1992).

introduction of innovative services at competitive prices. In balancing the public's interest against private interests, the Commission consistently has recognized that, especially in the realm of new satellite services, the market is a better guide than the regulatory process for the selection of service providers.

As a concomitant to its open skies policy, the Commission has demanded stringent financial and technical qualifications and has imposed specific "due diligence" requirements to avoid warehousing of spectrum. The combination of open entry policies and due diligence controls has worked extremely well.

Final Analysis believes that authorization of additional competition here is fully consistent with these well-established approaches. In the case of Little LEO services, which have very long lead times for full system implementation, authorization of new entrants now is the best means of accelerating the deployment of competitively provided services.

In view of the fact that additional entry of viably competitive systems is possible in the Little LEO market, there is no good rationale for the Commission to diverge from its traditional approach to use a different rationale that has the effect of precluding new entry. Adopting an approach that puts a premium on market concentration for the ostensible purpose of promoting economies of scale and scope -- but without demonstrated concomitant public benefit -- would be a significant departure the Commission's longstanding policies of promoting competition in satellite services.

3. General Economic Principles Favoring Avoidance of Concentration Support Authorization of More Competition

It can be plainly seen that the existing market structure for Little LEO services is inadequate. It is true that there are already three first round licensees. However, one of

these licensees, VITA, is a non-profit provider of particular Little LEO services to a small, niche set of users operating humanitarian missions in developing countries. VITA's operations are not commercially oriented and thus are not directly competitive with those of the other first round licensees, Orbcomm and Starsys. VITA's impact on the commercial dynamics of Little LEO industry is negligible. Consequently, VITA cannot be viewed as a commercial competitor, and should not be considered in any analysis of Little LEO commercial industry structure.

Thus, effectively there are only two commercial licensees. As discussed further in Final Analysis's Market Analysis, provided as Exhibit 1 hereto, it is well recognized that, although the existence of two service providers are better than one, such a market structure is far from optimal. In fact, in such a market structure there may not be sufficient price pressure to achieve lowest cost service to consumers, at least in the reasonably near future. Moreover, even though Starsys is a commercial licensee, it has been substantially delayed in implementing its system due to the need to focus on changes in ownership and control resulting from foreign investment. Only recently has Starsys been able to begin steps toward deployment.

Thus, especially with such a new and complex technology, placing sole reliance on two licensees that have not yet implemented their systems creates risks that the full public benefits of Little LEO services will not be achieved.

4. SCP Principles Also Indicate Additional Competition is Necessary

In this proceeding, the Commission proposes to support its tentative conclusion to exclude first round applicants through application of a "structure-conduct-performance" ("SCP") analysis. Final Analysis believes that the Commission need not reach beyond

existing FCC precedent and general economic principles to the use of a formal SCP model in the case of Little LEOs. In fact, the current status of the Little LEO industry as an emerging market does not necessarily lend itself well to formal SCP modeling. Nonetheless, application to the Little LEO industry of the basic principles underlying the SCP paradigm is instructive.

In Exhibit 1, Final Analysis examines Little LEO market characteristics according to the SCP approach (i.e., demand, supply, market structure, conduct and performance) and responds in detail to the specific questions posed in the Notice. This analysis demonstrates the following critical points:

(i) Overall demand for Little LEO services is large and growing and can support a fully competitive Little LEO industry, including all six commercial entrants from both the first and second rounds.

(ii) Little LEO services will be offered in a wide variety of submarkets spanning a continuum of diverse characteristics, including different polling frequencies (e.g., from intermittent to near real time), different throughput capabilities, varying market substitutes' different demand and supply elasticities, and in different geographic and demographic conditions. First round licensees already have sufficient spectrum to implement full constellations that can provide a full range of services. In the second round, Final Analysis and other applicants also have proposed constellations capable of offering all applications, including near real time. Final Analysis has found that, even though these categories of applications are somewhat separate, they are also closely linked. In particular, increasingly across a variety of submarkets, customers demand maximum availability and flexibility. For Little LEO operators, the ability to offer near real time services, or even the future potential

provision of such services, is extremely important to the development of many submarkets, and their ability to be effectively competitive in those submarkets.

(iii) Along the continuum of services, lower polling frequency (i.e., intermittent) applications tend to be more demand elastic with greater substitutability while higher polling frequency (i.e., near real time) applications tend to be less elastic with few economical substitutes. Additional Little LEO competition would contribute to better market performance in all Little LEO submarkets by improving service availability and price pressure.

(iv) The Little LEO market is not yet competitive and additional entry will result in public benefits across the full range of potential Little LEO applications, as long as competition is full and fair.

(v) The Commission's technical proposal, which requires timesharing resulting in significant outages in service coverage (discussed further below), would preclude provision by second round licensees from offering near real time services. This essentially hobbles second round entrants from becoming full competitors in important submarkets for near real time services.

(vi) The Commission's technical proposal would not permit second round licensees to maximize potential throughput capabilities under available frequencies, which also can impair the ability of second round entrants to be fully competitive. To mitigate this problem, Final Analysis proposes herein that, not only should different frequency pairings be considered, but also that WRC-95 uplink spectrum should be made available to second round applicants in this proceeding. As discussed further below, Final Analysis presents specific alternative proposals in Exhibit 3 hereto.

(vii) To achieve the benefits of full competition in the Little LEO industry as soon as possible, as many of the new second round entrants should be licensed as possible, with appropriate protections against spectrum warehousing.

(viii) The Commission should facilitate the rapid implementation of a fully competitive Little LEO industry, which will be best achieved by reserving assignment of future additional global allocations to existing applicants. This is critical for the quickest competitive implementation particularly for services of great public interest, such as near real time environmental, disaster and security alarm monitoring for which there are few economical substitutes.

In summary, there are great public benefits to be achieved by effective competition across the full range of Little LEO services. These benefits likely will not be fully achieved without authorization of additional entrants. Also, because of long lead times in the implementation of Little LEO systems, current applicants provide the best hope for development of fully competitive Little LEO markets in the near term. Therefore, we believe that the Commission should commit to a policy that gives the second round applicants the opportunity to be full competitors through assignment of existing as well as future spectrum required for deployment of fully competitive systems.

B. The Commission Should Adopt its Proposed Eligibility and Attribution Rules.

Final Analysis agrees that prohibiting first round Little LEO licensees and affiliates of Little LEO licensees from participating in the second processing round will enhance competition by allowing second round Little LEO satellite service providers to enter the

marketplace.[11] Rules to determine whether an applicant is affiliated with an existing Little LEO licensee for purposes of disqualifying that applicant from eligibility for the second processing round should be consistent with existing Commission standards on attribution of ownership.

Final Analysis supports the Commission's conclusion that ownership interests of five percent or more (whether voting or nonvoting), and partnership interests (whether general or limited) may raise anticompetitive concerns.[12] Absent ownership or controlling interests, however, the Commission should not foreclose sharing arrangements between first round Little LEO licensees and second round applicants. Second round applicants should be allowed to engage in commercial arrangements with first round licensees that are conducted on an arm's-length basis with no cognizable joint marketing or joint operations. In particular, Final Analysis's transponder supply arrangement with VITA should not trigger an attributable interest because it is a purely arm's length agreement in which no aspects of ownership or control are involved.

Final Analysis believes that its arrangement is not captured within any of the relationships itemized in the Commission's proposed attribution rules. In particular, it does not involve any exchange or sharing of equity or debt interests. Also, the arrangement does not constitute a management, joint marketing or joint operating agreement. Final Analysis simply proposes to provide satellite transmission capacity to VITA. VITA remains completely and solely responsible for the use of the capacity. Final Analysis has the right to

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[11] See id.

[12] Notice at ¶ 16.

use some of that capacity, as consideration for making it available to VITA. However, no revenues will be shared, and no joint operations will be undertaken. Final Analysis will use the capacity made available to it by VITA for completely different applications for completely different users than those served by VITA.

Also, the Final Analysis arrangement with VITA does not implicate the apparent concerns underlying the proposed attribution rules. Specifically, the apparent purpose of the proposed rules is to prevent first round commercial licensees from being able to "bootstrap" their way back into the second round. Not only is VITA not a licensee for a commercial system, but it gains no access to spectrum that would otherwise be reserved to new second round applicants through its arrangement with Final Analysis.

Allowing Final Analysis to continue its arrangement with VITA thus is in the public interest. Final Analysis respectfully requests that the Commission confirm this conclusion.

III. THE SPECTRUM PLAN PROPOSED IN THE NOTICE, IF MODIFIED, WILL SUPPORT COMMERCIALLY VIABLE, BUT NOT FULLY COMPETITIVE, LITTLE LEO SYSTEMS.

A. The Approach Proposed in the Notice Is a Good Start But Must be Improved

The Notice tentatively proposes to establish three second round Little LEO systems in the 148-150.05 MHz, 137-138 MHz and 400.15-401 MHz bands.[13] Final Analysis believes the Commission has made a very good effort to accommodate second round Little LEO applicants by proposing a spectrum arrangement that identifies three separate systems (respectively, "Little LEO-1", "Little LEO-2" and "Little LEO-3"). Final Analysis appreciates the fact that the Commission has endeavored to accommodate as many of the

[13] See Notice at ¶ 41.

second round applicants as possible within the very limited spectrum available as well as within the complex technical constraints attendant to the use of the particular frequencies involved. Final Analysis believes that commercially viable operations can be supported by at least two of the three proposed systems. Moreover, Final Analysis possesses all the technical capabilities to meet the requirements of these proposed systems.

However, there are aspects of the Commission's proposal which do not accommodate particular needs and characteristics of Little LEO systems and do not optimize the potential of this limited spectrum to support Little LEO operations. This section reviews these essential characteristics and summarizes Final Analysis's technical review of the Commission's proposed systems. For this purpose, Final Analysis has performed an exhaustive in-house technical review[14] (attached hereto as Exhibit 2) and requested an independent study performed by Autometric, Inc. (provided as Attachment A to Exhibit 2). This technical review provides the foundation for alternative band plan proposals offered by Final Analysis which are set forth in detail in Exhibit 3 hereto and discussed further in Section III.B. below.

As an initial matter, it is imperative for the Commission to realize that any proposed systems that may be authorized in this proceeding, subject to the spectrum limitations and time sharing requirements the Commission has identified, will not permit Little LEO operations to reach their full potential. In particular, each of the three systems proposed in the Notice would suffer serious service outages. Specific details concerning these outages are discussed in this section. In fact, however, any approach to assignment of the limited

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[14] See Final Analysis Communication Services, Inc., SYSTEMS ANALYSIS.

spectrum currently available in this proceeding will subject Little LEO operators to significant outages. Such service outages will hamper development of Little LEO systems that can be fully competitive in the provision of near real time services, which constitute an important subsegment of the overall Little LEO market. Final Analysis discusses this issue further in Section IV below, wherein it is proposed that additional spectrum must be made available to second round applicants to ensure operations fully competitive with first round licensees.

1. Fully Competitive Systems Have Particular Spectrum Requirements Not Taken Into Account in the Notice.

Little LEO Coverage Requirements. In its November 1994 application, Final Analysis proposes a constellation to provide full global coverage and near-real time response.[15] As detailed below, however, the capacity and sharing constraints associated with Little LEO-1, Little LEO-2 and Little LEO-3 would result in coverage levels that are much lower and outages that are much higher than would fully support Final Analysis's overall business plan. Specifically, Final Analysis's technical review indicates that the Commission's proposal would provide *maximum* coverage levels of approximately 65 percent of time on a global basis.[16]

There are many market segments that can be reached with such low polling frequency. These market subsegments are specifically identified in Final Analysis's Market Analysis in Exhibit 1. Final Analysis agrees that initial commercial operations can be

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[15] See Final Analysis Communication Services, Inc., Application File No. 25-SAT-P/LA-95 (November 1994).

[16] See Autometric Study, Attachment A.

supported in these submarkets under the conditions in the Commission's proposal. However, it is also crucial to recognize that many submarkets cannot be addressed. These include emergency communications and warning systems, messaging, asset tracking for transportation and freight industries, and remote monitoring and supervisory control and data acquisition, all of which demand very high coverage levels.[17] At the same time, data reveals a low tolerance for system outages among potential market segments. Therefore, the system outages associated with each of the three systems proposed in the Notice will impair the ability of second round Little LEO licensees to serve these important market segments, especially with near-real time and real-time response.

Uplink-to-Downlink Ratios. Little LEO operations will require more spectrum for uplink operations than for downlink operations. The ITU-R Document 8D/136 (the "Working Group 8D Study") shows that the ratio of service uplink-to-downlink spectrum required for commercial Little LEO operations will be approximately 2-to-1.[18]

Some applications, such as vehicle and personal messaging, will involve transmissions via service downlinks. However, there are many applications, such as automated meter reading and remote asset tracking communications that will require significant service uplink and only limited service downlink. Overall, more service uplink is needed than service downlink. The framework proposed in the Notice, however, does not provide for adequate

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[17] See Sub-Working Group 8D3A-6, Spectrum Demand for Non-GSO MSS Below 1 GHz Services ITU-R Document 8D/136 (November 5, 1996) ("Working Group 8D Study") attached hereto as Exhibit B.

[18] Uplink operations on a shared basis will require approximately 13.6 MHz of spectrum, while downlink operations on a shared basis will require approximately 7 MHz of spectrum. See Working Group 8D Study at §§ 3.1-3.2, attached hereto as Exhibit B.

service uplink. This is why allocation of additional uplink spectrum allocated at WRC-95 to the eventual second round Little LEO licensees is so essential to the ability of second round Little LEO operators to support critical service applications.

Dedicated Feeder Links. Dedicated Feeder links are essential to commercial Little LEO operations.[19] Feeder links are the radio spectrum used to feed information from other networks, such as the public switched network via gateway stations, to the satellite and then on via service links to the consumer.[20]

Feeder links are necessary for "continuous communications between an operational spacecraft and at least one gateway to provide, among other things, for the real time relay of messages between users and the gateway."[21] The Commission's record on Little LEOs already recognizes that at least 50 kHz of spectrum per satellite in each direction (and approximately 150 kHz per constellation, in each direction, because of multiple overlapping satellites) must be dedicated on an exclusive basis to feeder link operations in a Little LEO

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[19] A feeder link is

> . . . a radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed satellite service. The given location may be at a specified fixed point, or at any fixed point within specified areas.

47 C.F.R. § 2.1.

[20] See Preparation for International Telecommunication Union World Radiocommunication Conferences, IC Docket No. 94-31, Report, 78 Rad. Reg. 2d (P&F) 747, 748 n.12 (1995) ("WRC-95 Report").

[21] See Little LEO Notice, 8 FCC Rcd 6330 at ¶ 11; see also Report of the Below 1 GHz LEO Negotiated Rulemaking Committee at 6 (September 16, 1992) ("Below 1 GHz Negotiated Rulemaking Report").